11.2 Displaying Data – Overview

Frequency Tables (Distributions)

Summarize datasets by counting the number of observations for each category, distinct value or interval.

- Can be used for categorical data and quantitative (numerical) data.

count Relative Frequency

Type of Computer	Frequency	Percent
Desktop	11	11/50 = 22%
Laptop	23	23/50 = 46%
Notebook	9	9/50 = 18%
Tablet	7	7/50 = 14%

Total 50

Number of Pets	Frequency
1	4
2	3
3	2
4	1
5	2
6	1
7	1
8	1

Grouped Frequency Distribution

Number of Pets	Frequency
1-2	7
3-4	3
5-6	3
7-8	2

Find count between 4 and 7 inclusive: 4, 5, 6, & 7

Example 1: Construct a frequency table using the data below.

38, 33, 5, 5, 47, 29, 24, 42, 3, 18, 30, 46, 25, 44, 40, 42, 39, 44, 29, 13

lower class limit = 0

upper class limit = 9

Class width = $Lower_2 - Lower_1$

10 = 40 − 30

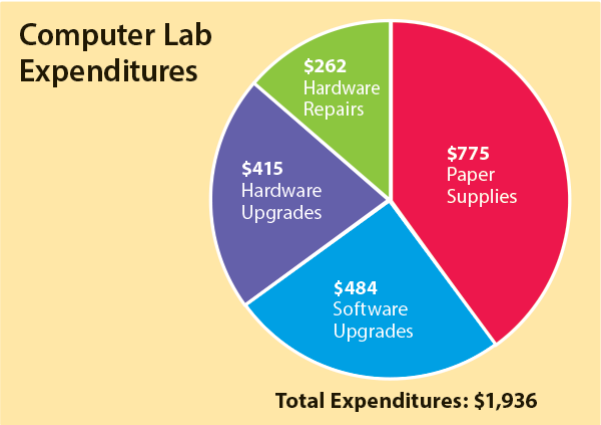
* All class widths must be equivalent

Class	Frequency	Relative Frequency
0-9	3	3/20 = 0.15
10-19	2	2/20 = 0.10
20-29	4	4/20 = 0.20
30-39	4	4/20 = 0.20
40-49	7	7/20 = 0.35
Total:	20	20/20 = 1

Graphical Displays of Data

Pie Chart

- Compare parts to a whole.
- Slices represent the proportion of a category



Type of Data: Categorical

Advantages:

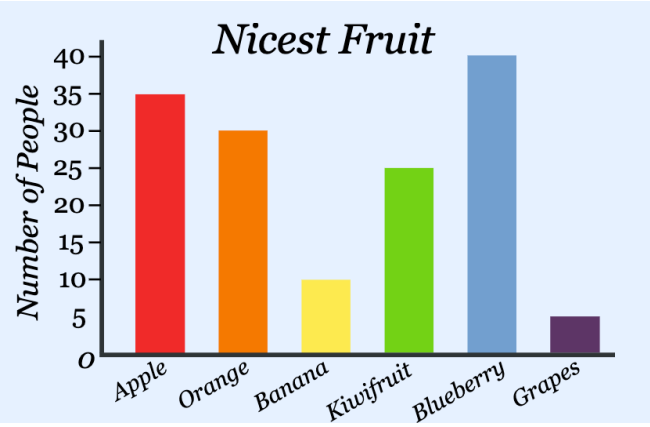
* Simple and common

Disadvantages:

* Harder to compare area than heights
* Not useful when there are lots of categories
* Easy to be misleading if visually distorted (3D, one slice is larger) or labels are not clear

Bar Graphs

- Height of the bar represents the amount of data in each category.
- Can be counts or relative frequencies.



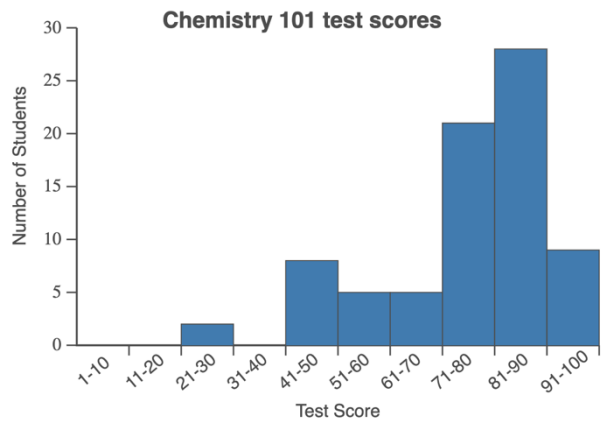
Type of Data: Categorical

Advantages:
* Simple and common and easy to read

Disadvantages:
* Misleading if:
  - Bars are not equal width
  - Inconsistent vertical scale
  - Vertical scale is truncated (not start at 0)

Histograms

- Height of the bar represents the amount of data in each class.
- Can be counts or relative frequencies.



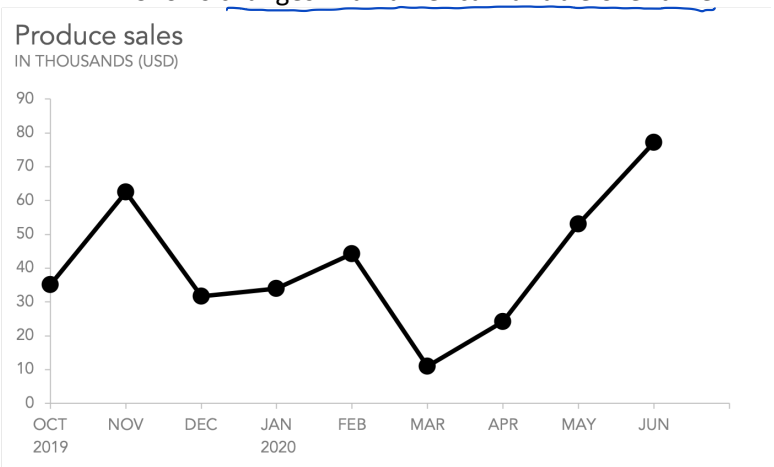
Type of Data: Quantitative

Advantages:
* Simple
* Can show lots of data very concisely
* Shows "shape" or distribution of data

Disadvantages:
* Class width impacts the plot drastically
* Misleading if:
  - Bars are not equal width
  - Inconsistent horizontal / vertical scale
  - Vertical scale is truncated (not start at 0)

Line Graphs

- Shows changes in a numerical variable over time.



Type of Data: Quantitative

Advantages:
* Shows trends over time

Disadvantages:
* Misleading if:
  - Inconsistent horizontal / vertical scale
  - Vertical scale is truncated (not start at 0)

Good Graphs: A clear graph should have a title, labels on the vertical and horizontal axis, and should reference the source of the data.